SEQUENCE LISTING

<110> TAYLOR, Catherine, et al.

<120> Methods and Compositions for Modulating
   Senescense

<130> 10799/13

<140> Not Assigned
<141> 2001-07-23

<160> 21

<170> FastSEQ for Windows Version 4.0

<210> 1
<211> 1139
<212> DNA
<213> Rodent

<220>
<221> CDS
<222> (33)...(497)

<400> 1
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caggtctaga gttggaatcg aagcctctta aa atg gca gat gat ttg gac ttc     53
                                    Met Ala Asp Asp Leu Asp Phe
                                     1               5

gag aca gga gat gca ggg gcc tca gcc acc ttc cca atg cag tgc tca    101
Glu Thr Gly Asp Ala Gly Ala Ser Ala Thr Phe Pro Met Gln Cys Ser
        10                  15                  20

gca tta cgt aag aat ggt ttt gtg gtg ctc aag ggc cgg cca tgt aag    149
Ala Leu Arg Lys Asn Gly Phe Val Val Leu Lys Gly Arg Pro Cys Lys
        25                  30                  35

atc gtc gag atg tct act tcg aag act ggc aag cat ggc cat gcc aag    197
Ile Val Glu Met Ser Thr Ser Lys Thr Gly Lys His Gly His Ala Lys
 40                  45                  50                  55

gtc cat ctg gtt ggt att gat att ttt act ggg aag aaa tat gaa gat    245
Val His Leu Val Gly Ile Asp Ile Phe Thr Gly Lys Lys Tyr Glu Asp
                    60                  65                  70

atc tgc ccg tcg act cat aac atg gat gtc ccc aac atc aaa agg aat    293
Ile Cys Pro Ser Thr His Asn Met Asp Val Pro Asn Ile Lys Arg Asn
                75                  80                  85

gat ttc cag ctg att ggc atc cag gat ggg tac cta tcc ctg ctc cag    341
Asp Phe Gln Leu Ile Gly Ile Gln Asp Gly Tyr Leu Ser Leu Leu Gln
            90                  95                  100

gac agt ggg gag gta cga gag gac ctt cgt ctg cct gag gga gac ctt    389
Asp Ser Gly Glu Val Arg Glu Asp Leu Arg Leu Pro Glu Gly Asp Leu
        105                 110                 115

ggc aag gag att gag cag aag tat gac tgt gga gaa gag atc ctg atc    437
Gly Lys Glu Ile Glu Gln Lys Tyr Asp Cys Gly Glu Glu Ile Leu Ile
120                 125                 130                 135
```

1

```
aca gtg ctg tcc gcc atg aca gag gag gca gct gtt gca atc aag gcc    485
Thr Val Leu Ser Ala Met Thr Glu Glu Ala Ala Val Ala Ile Lys Ala
            140                 145                 150

atg gca aaa taa ctggcttcca gggtggcggt ggtggcagca gtgatccatg    537
Met Ala Lys  *


agcctacaga ggcccctccc ccagctctgg ctgggccctt ggctggactc ctatccaatt  597
tatttgacgt tttattttgg ttttcctcac cccttcaaac tgtcggggag accctgccct  657
tcacctagct cccttggcca ggcatgaggg agccatggcc ttggtgaagc tacctgcctc  717
ttctctcgca gccctgatgg gggaaaggga gtgggtactg cctgtggttt aggttcccct  777
ctcccttttt cttttaatt caatttggaa tcagaaagct gtggattctg caaatggtc  837
ttgtgtcctt tatcccactc aaacccatct ggtccctgt tctccatagt ccttcacccc  897
caagcaccac tgacagactg gggaccagcc cccttccctg cctgtgtctc ttcccaaacc  957
cctctatagg ggtgacaaga agaggagggg gggaggggac acgatccctc ctcaggcatc  1017
tgggaaggcc ttgcccccat gggctttacc ctttcctgtg ggctttctcc ctgacacatt  1077
tgttaaaaat caaacctgaa taaaactaca agtttaatat gaaaaaaaaa aaaaaaaaa  1137
aa                                                              1139

<210> 2
<211> 154
<212> PRT
<213> Rodent

<400> 2
Met Ala Asp Asp Leu Asp Phe Glu Thr Gly Asp Ala Gly Ala Ser Ala
 1               5                  10                  15
Thr Phe Pro Met Gln Cys Ser Ala Leu Arg Lys Asn Gly Phe Val Val
            20                  25                  30
Leu Lys Gly Arg Pro Cys Lys Ile Val Glu Met Ser Thr Ser Lys Thr
        35                  40                  45
Gly Lys His Gly His Ala Lys Val His Leu Val Gly Ile Asp Ile Phe
    50                  55                  60
Thr Gly Lys Lys Tyr Glu Asp Ile Cys Pro Ser Thr His Asn Met Asp
65                  70                  75                  80
Val Pro Asn Ile Lys Arg Asn Asp Phe Gln Leu Ile Gly Ile Gln Asp
                85                  90                  95
Gly Tyr Leu Ser Leu Leu Gln Asp Ser Gly Glu Val Arg Glu Asp Leu
            100                 105                 110
Arg Leu Pro Glu Gly Asp Leu Gly Lys Glu Ile Glu Gln Lys Tyr Asp
        115                 120                 125
Cys Gly Glu Glu Ile Leu Ile Thr Val Leu Ser Ala Met Thr Glu Glu
    130                 135                 140
Ala Ala Val Ala Ile Lys Ala Met Ala Lys
145                 150

<210> 3
<211> 462
<212> DNA
<213> Rodent

<400> 3
atggcagatg acttggactt cgagacagga gatgcagggg cctcagccac cttccccaatg  60
cagtgctcag cattacgtaa gaatggcttt gtggtgctca aaggccggcc atgtaagatc  120
gtcgagatgt ctacttcgaa gactggcaag cacggccacg ccaaggtcca tctggttggt  180
attgacatct ttactgggaa gaaatatgaa gatatctgcc cgtcaactca taatatggat  240
gtccccaaca tcaaaaggaa tgacttccag ctgattggca tccaggatgg gtacctatca  300
ctgctccagg acagcggga ggtacgagag gaccttcgtc tccctgaggg agaccttggc  360
aaggagattg agcagaagta cgactgtgga gaagagatcc tgatcacggt gctgtctgcc  420
atgacagagg aggcagctgt tgcaatcaag gccatggcaa aa                462
```

2

<210> 4
<211> 462
<212> DNA
<213> Rodent

<220>
<221> misc_feature
<222> (1)...(462)
<223> n = A,T,C or G

<400> 4
atggcagacg aaattgattt cactactgga gatgccgggg cttccagcac ttaccctatg 60
cagtgctcgg ccttgcgcaa aaacggcttc gtggtgctca aaggacgacc atgcaaaata 120
gtggagatgt caacttccaa aactggaaag catggtcatg ccaaggttca ccttgttgga 180
attgatattt tcacgggcaa aaaatatgaa gatatttgtc cttctactca caacatggat 240
gttccaaata ttaagagaaa tgattatcaa ctgatatgca ttcaagatgg ttacctttcc 300
ctgctgacag aaactggtga agttcgtgag gatcttaaac tgccagaagg tgaactaggc 360
aaagaaatag agggaaaata caatgcaggt gaagatgtac aggtgtctgt catgtgtgca 420
atgagtgaag aatatgctgt agccataaaa ccctnngcaa at 462

<210> 5
<211> 462
<212> DNA
<213> Rodent

<400> 5
atggcagatg atttggactt cgagacagga gatgcagggg cctcagccac cttcccaatg 60
cagtgctcag cattacgtaa gaatggtttt gtggtgctca aaggccggcc atgtaagatc 120
gtcgagatgt ctacttcgaa gactggcaag catggccatg ccaaggtcca tctggttggc 180
attgacattt ttactgggaa gaaatatgaa gatatctgcc cgtcgactca taatatggat 240
gtccccaaca tcaaacggaa tgacttccag ctgattggca tccaggatgg gtacctatcc 300
ctgctccagg acagtgggga ggtacgagag gaccttcgtc tgcctgaagg agaccttggc 360
aaggagattg agcagaagta tgactgtgga gaagagatcc tgatcacagt gctgtctgcc 420
atgacagagg aggcagctgt tgcaatcaag gccatggcaa aa 462

<210> 6
<211> 606
<212> DNA
<213> Rodent

<220>
<221> CDS
<222> (1)...(456)

<400> 6
gct gtg tat tat tgg gcc cat aag aac cac ata cct gtg ctg agt cct   48
Ala Val Tyr Tyr Trp Ala His Lys Asn His Ile Pro Val Leu Ser Pro
1   5   10   15

gca ctc aca gac ggc tca ctg ggt gac atg atc ttt ttc cat tcc tat   96
Ala Leu Thr Asp Gly Ser Leu Gly Asp Met Ile Phe Phe His Ser Tyr
                20   25   30

aaa aac cca ggc ttg gtc ctg gac atc gtt gaa gac ctg cgg ctc atc   144
Lys Asn Pro Gly Leu Val Leu Asp Ile Val Glu Asp Leu Arg Leu Ile
            35   40   45

aac atg cag gcc att ttc gcc aag cgc act ggg atg atc atc ctg ggt   192
Asn Met Gln Ala Ile Phe Ala Lys Arg Thr Gly Met Ile Ile Leu Gly
        50   55   60

gga ggc gtg gtc aag cac cac atc gcc aat gct aac ctc atg cgg aat   240
Gly Gly Val Val Lys His His Ile Ala Asn Ala Asn Leu Met Arg Asn

3

```
gga gct gac tac gct gtt tat atc aac aca gcc cag gag ttt gat ggc  288
Gly Ala Asp Tyr Ala Val Tyr Ile Asn Thr Ala Gln Glu Phe Asp Gly
                85                    90                    95

tca gac tca gga gcc cgg cca gat gag gct gtc tcc tgg ggc aag atc  336
Ser Asp Ser Gly Ala Arg Pro Asp Glu Ala Val Ser Trp Gly Lys Ile
            100                   105                   110

cgg atg gat gca cag cca gta aag gtc tat gct gat gca tct ctg gtt  384
Arg Met Asp Ala Gln Pro Val Lys Val Tyr Ala Asp Ala Ser Leu Val
            115                   120                   125

ttc ccc ttg ctg gtg gct gag aca ttc gcc caa aag gca gat gcc ttc  432
Phe Pro Leu Leu Val Ala Glu Thr Phe Ala Gln Lys Ala Asp Ala Phe
            130                   135                   140

aga gct gag aag aat gag gac tga gcagatgggt aaagacggag gcttctgcca  486
Arg Ala Glu Lys Asn Glu Asp  *
145                   150

cacctttatt tattatttgc ataccaaccc ctcctgggcc ctctccttgg tcagcagcat  546
cttgagaata aatggccttt ttgttggttt ctgtaaaaaa aggactttaa aaaaaaaaaa  606
```

```
<210> 7
<211> 151
<212> PRT
<213> Rodent

<400> 7
Ala Val Tyr Tyr Trp Ala His Lys Asn His Ile Pro Val Leu Ser Pro
 1               5                   10                  15
Ala Leu Thr Asp Gly Ser Leu Gly Asp Met Ile Phe Phe His Ser Tyr
            20                  25                  30
Lys Asn Pro Gly Leu Val Leu Asp Ile Val Glu Asp Leu Arg Leu Ile
        35                  40                  45
Asn Met Gln Ala Ile Phe Ala Lys Arg Thr Gly Met Ile Ile Leu Gly
    50                  55                  60
Gly Gly Val Val Lys His His Ile Ala Asn Ala Asn Leu Met Arg Asn
65                  70                  75                  80
Gly Ala Asp Tyr Ala Val Tyr Ile Asn Thr Ala Gln Glu Phe Asp Gly
                85                  90                  95
Ser Asp Ser Gly Ala Arg Pro Asp Glu Ala Val Ser Trp Gly Lys Ile
            100                 105                 110
Arg Met Asp Ala Gln Pro Val Lys Val Tyr Ala Asp Ala Ser Leu Val
            115                 120                 125
Phe Pro Leu Leu Val Ala Glu Thr Phe Ala Gln Lys Ala Asp Ala Phe
            130                 135                 140
Arg Ala Glu Lys Asn Glu Asp
145                 150
```

```
<210> 8
<211> 453
<212> DNA
<213> Rodent

<400> 8
tccgtgtatt actgggccca gaagaaccac atccctgtgt ttagtcccgc acttacagac  60
ggctcgctgg gcgacatgat cttcttccat tcctacaaga accgggcct ggtcctggac  120
atcgttgagg acctgaggct catcaacaca caggccatct ttgccaagtg cactgggatg  180
```

4

```
atcattctgg gcgggggcgt ggtcaagcac cacattgcca atgccaacct catgcggaac 240
ggggccgact acgctgttta catcaacaca gcccaggagt ttgatggctc tgactcaggt 300
gcccgaccag acgaggctgt ctcctggggc aagatccggg tggatgcaca gcccgtcaag 360
gtctatgctg acgcctccct ggtcttcccc ctgcttgtgg ctgaaacctt tgcccagaag 420
atggatgcct tcatgcatga gaagaacgag gac                              453
```

```
<210> 9
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<221> misc_feature
<222> (1)...(20)
<223> n = A,T,C or G

<400> 9
tcsaarachg gnaagcaygg                                              20

<210> 10
<211> 42
<212> DNA
<213> Rodent

<220>
<223> Primer

<400> 10
gcgaagcttc catggctcga gtttttttttt ttttttttttt tt                  42

<210> 11
<211> 972
<212> DNA
<213> Rodent

<220>
<221> CDS
<222> (1)...(330)

<400> 11
tcg aag acc ggt aag cac ggc cat gcc aag gtc cat ctg gtt ggt att   48
Ser Lys Thr Gly Lys His Gly His Ala Lys Val His Leu Val Gly Ile
 1               5                   10                  15

gat att ttt act ggg aag aaa tat gaa gat atc tgc ccg tcg act cat   96
Asp Ile Phe Thr Gly Lys Lys Tyr Glu Asp Ile Cys Pro Ser Thr His
             20                  25                  30

aac atg gat gtc ccc aac atc aaa agg aat gat ttc cag ctg att ggc   144
Asn Met Asp Val Pro Asn Ile Lys Arg Asn Asp Phe Gln Leu Ile Gly
         35                  40                  45

atc cag gat ggg tac cta tcc ctg ctc cag gac agt ggg gag gta cga   192
Ile Gln Asp Gly Tyr Leu Ser Leu Leu Gln Asp Ser Gly Glu Val Arg
     50                  55                  60

gag gac ctt cgt ctg cct gag gga gac ctt ggc aag gag att gag cag   240
Glu Asp Leu Arg Leu Pro Glu Gly Asp Leu Gly Lys Glu Ile Glu Gln
 65                  70                  75                  80

aag tat gac tgt gga gaa gag atc ctg atc aca gtg ctg tcc gcc atg   288
```

5

```
                Lys Tyr Asp Cys Gly Glu Glu Ile Leu Ile Thr Val Leu Ser Ala Met
                            85                  90                  95


aca gag gag gca gct gtt gca atc aag gcc atg gca aaa taa                  330
Thr Glu Glu Ala Ala Val Ala Ile Lys Ala Met Ala Lys    *
            100                 105


ctggcttcca gggtggcggt ggtggcagca gtgatccatg agcctacaga ggcccctccc 390
ccagctctgg ctgggccctt ggctggactc ctatccaatt tatttgacgt tttattttgg 450
ttttcctcac cccttcaaac tgtcgggggag accctgccct tcacctagct cccttggcca 510
ggcatgaggg agccatggcc ttggtgaagc tacctgcctc ttctctcgca gccctgatgg 570
gggaaaggga gtgggtactg cctgtggttt aggttcccct ctcccttttt cttttttaatt 630
caatttggaa tcagaaagct gtggattctg gcaaatggtc ttgtgtcctt tatcccactc 690
aaacccatct ggtcccctgt tctccatagt ccttcacccc caagcaccac tgacagactg 750
gggaccagcc cccttccctg cctgtgtctc ttcccaaacc cctctatagg ggtgacaaga 810
agaggagggg gggaggggac acgatccctc ctcaggcatc tgggaaggcc ttgcccccat 870
gggctttacc ctttcctgtg ggctttctcc ctgacacatt tgttaaaaat caaacctgaa 930
taaaactaca agtttaatat gaaaaaaaaa aaaaaaaaaa aa                        972
```

<210> 12
<211> 109
<212> PRT
<213> Rodent

<400> 12
```
Ser Lys Thr Gly Lys His Gly His Ala Lys Val His Leu Val Gly Ile
 1               5                   10                  15
Asp Ile Phe Thr Gly Lys Lys Tyr Glu Asp Ile Cys Pro Ser Thr His
            20                  25                  30
Asn Met Asp Val Pro Asn Ile Lys Arg Asn Asp Phe Gln Leu Ile Gly
        35                  40                  45
Ile Gln Asp Gly Tyr Leu Ser Leu Leu Gln Asp Ser Gly Glu Val Arg
    50                  55                  60
Glu Asp Leu Arg Leu Pro Glu Gly Asp Leu Gly Lys Glu Ile Glu Gln
65                  70                  75                  80
Lys Tyr Asp Cys Gly Glu Glu Ile Leu Ile Thr Val Leu Ser Ala Met
            85                  90                  95
Thr Glu Glu Ala Ala Val Ala Ile Lys Ala Met Ala Lys
            100                 105
```


<210> 13
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 13
```
caggtctaga gttggaatcg aagc                                           24
```

<210> 14
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 14
```
atatctcgag ccttgattgc aacagctgcc                                     30
```

6

<210> 15
<211> 489
<212> DNA
<213> Rodent

<220>
<221> CDS
<222> (33)...(485)

<400> 15
caggtctaga gttggaatcg aagcctctta aa atg gca gat gat ttg gac ttc   53
                                       Met Ala Asp Asp Leu Asp Phe
                                       1   5

gag aca gga gat gca ggg gcc tca gcc acc ttc cca atg cag tgc tca   101
Glu Thr Gly Asp Ala Gly Ala Ser Ala Thr Phe Pro Met Gln Cys Ser
            10   15   20

gca tta cgt aag aat ggt ttt gtg gtg ctc aag ggc cgg cca tgt aag   149
Ala Leu Arg Lys Asn Gly Phe Val Val Leu Lys Gly Arg Pro Cys Lys
        25   30   35

atc gtc gag atg tct act tcg aag act ggc aag cat ggc cat gcc aag   197
Ile Val Glu Met Ser Thr Ser Lys Thr Gly Lys His Gly His Ala Lys
    40   45   50   55

gtc cat ctg gtt ggt att gat att ttt act ggg aag aaa tat gaa gat   245
Val His Leu Val Gly Ile Asp Ile Phe Thr Gly Lys Lys Tyr Glu Asp
                60   65   70

atc tgc ccg tcg act cat aac atg gat gtc ccc aac atc aaa agg aat   293
Ile Cys Pro Ser Thr His Asn Met Asp Val Pro Asn Ile Lys Arg Asn
                75   80   85

gat ttc cag ctg att ggc atc cag gat ggg tac cta tcc ctg ctc cag   341
Asp Phe Gln Leu Ile Gly Ile Gln Asp Gly Tyr Leu Ser Leu Leu Gln
            90   95   100

gac agt ggg gag gta cga gag gac ctt cgt ctg cct gag gga gac ctt   389
Asp Ser Gly Glu Val Arg Glu Asp Leu Arg Leu Pro Glu Gly Asp Leu
    105   110   115

ggc aag gag att gag cag aag tat gac tgt gga gaa gag atc ctg atc   437
Gly Lys Glu Ile Glu Gln Lys Tyr Asp Cys Gly Glu Glu Ile Leu Ile
120   125   130   135

aca gtg ctg tcc gcc atg aca gag gag gca gct gtt gca atc aag gct   485
Thr Val Leu Ser Ala Met Thr Glu Glu Ala Ala Val Ala Ile Lys Ala
            140   145   150

cgag   489

<210> 16
<211> 151
<212> PRT
<213> Rodent

<400> 16
Met Ala Asp Asp Leu Asp Phe Glu Thr Gly Asp Ala Gly Ala Ser Ala
 1   5   10   15
Thr Phe Pro Met Gln Cys Ser Ala Leu Arg Lys Asn Gly Phe Val Val
            20   25   30
Leu Lys Gly Arg Pro Cys Lys Ile Val Glu Met Ser Thr Ser Lys Thr

7

```
                35                        40                        45
Gly Lys His Gly His Ala Lys Val His Leu Val Gly Ile Asp Ile Phe
    50                        55                        60
Thr Gly Lys Lys Tyr Glu Asp Ile Cys Pro Ser Thr His Asn Met Asp
65                        70                        75                        80
Val Pro Asn Ile Lys Arg Asn Asp Phe Gln Leu Ile Gly Ile Gln Asp
                85                        90                        95
Gly Tyr Leu Ser Leu Leu Gln Asp Ser Gly Glu Val Arg Glu Asp Leu
                100                       105                       110
Arg Leu Pro Glu Gly Asp Leu Gly Lys Glu Ile Glu Gln Lys Tyr Asp
            115                       120                       125
Cys Gly Glu Glu Ile Leu Ile Thr Val Leu Ser Ala Met Thr Glu Glu
    130                       135                       140
Ala Ala Val Ala Ile Lys Ala
145                       150
```

<210> 17
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 17
gtctgtgtat tattgggccc   20

<210> 18
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Primer

<400> 18
gcgaagcttc catggctcga gttttttttt ttttttttttt tt   42

<210> 19
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223>

<400> 19
ttgaaggggt gaggaaaa   18

<210> 20
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223>

<400> 20
ttgagtggga taaag   15

<210> 21
<211> 18

```
<212> DNA
<213> Artificial Sequence

<220>
<223>

<400> 21
aatcatctgc cattttaa                                              18
```